

1.           A dead bolt lock system for use on a door leading to a secure area, the lock system comprising:

                  an enclosed housing structure having an interior and adapted to be mounted to the door,

5                   a dead bolt mounted in the interior of the housing structure for movement between an extended position in which a portion of the dead bolt extends out of the interior of the housing structure and a retracted position in which the dead bolt is more fully contained within the interior of the housing structure,

10                  dead bolt retracting structure operatively connected to the dead bolt for moving the dead bolt from the extended position to the retracted position,

                  a first security lock including a casing and a lock member each contained within the interior of the housing structure and said lock member  
15                  moved from a locked condition extending outwardly from said casing to an unlocked condition retracted within said casing by the input of correct unlocking information, and

                  a first test member mounted within the housing structure for movement adjacent to the lock member of the first security lock in a  
20                  transverse direction relative to the movement of said lock member, said first test member further mounted for movement relative to the dead bolt and coupled with the dead bolt retracting structure to prevent retraction of the dead bolt when the lock member is in the locked condition and movable in

said transverse direction into a space created by the lock member in the  
25 unlocked condition to thereby allow retraction of the dead bolt.

2. The dead bolt lock system of claim 1, wherein the security  
lock is mounted within the housing structure.

3. A dead bolt lock system for use on a door leading to a secure area, the lock system comprising:

an enclosed housing structure having an interior and adapted to be mounted to the door,

5 a dead bolt mounted in the housing structure for movement between an extended position in which the dead bolt extends out of the interior of the housing structure and a retracted position in which a portion of the dead bolt is more fully contained within the interior of the housing structure,

10 an electrically operated access control including a movable member contained within the interior of the housing structure and having locked and unlocked conditions, with said unlocked condition being controlled by the input of correct unlocking information into the access control,

15 a test member mounted within the interior of the housing structure and operatively connected for movement relative to both the movable member and the dead bolt such that when the movable member is in the unlocked condition, the test member moves through a space normally occupied by the movable member in the locked condition and thereby  
20 allows movement of the dead bolt to the retracted position.

4. The dead bolt lock system of claim 3, wherein the access control is a solenoid device.

5. The dead bolt lock system of claim 4, wherein the movable member of the solenoid device is a reciprocating piston element.

6. The dead bolt lock system of claim 3, wherein the access control is a combination lock which is at least partially under electric control and the movable member is a lock bolt.

7. The dead bolt lock system of claim 6, wherein the combination lock is an electro-mechanical lock.

8. A dead bolt lock system for use on a door leading to a secure area, the lock system comprising:

an enclosed housing structure having an interior and adapted to be mounted to the door,

5 a dead bolt mounted in the housing structure for movement between an extended position in which a portion of the dead bolt extends out of the interior of the housing structure and a retracted position in which the dead bolt is more fully contained within the interior of the housing structure,

10 a first security lock mounted in the interior of the housing structure and including a first casing and a first movable lock member contained in the interior of the housing structure, the first movable lock member having a locked condition extending outwardly from said first casing and an unlocked condition retracted within said first casing and  
15 controlled by the input of correct unlocking information,

a second security lock mounted in the interior of the housing structure and including a second casing and a second movable lock member contained in the interior of the housing structure, the second movable lock member having a locked condition extending outwardly from said second  
20 casing and an unlocked condition retracted within said second casing and controlled by the input of correct unlocking information,

first and second test members mounted within the interior of the housing structure for movement adjacent the respective first and second movable lock members and movable in respective transverse

25        directions relative to the movement of said first and second movable lock  
members to test whether the movable lock members are in locked or  
unlocked conditions, and

              dead bolt retracting structure within the interior of the housing  
structure and operatively connected to the first and second movable lock  
30        members, the first and second test members and to the dead bolt such that  
both the first and second movable lock members must be in the unlocked  
condition for the retracting structure to move the dead bolt to the retracted  
position, and during movement of the retracting structure to retract the  
dead bolt the test members move relative to the dead bolt to test the  
35        condition of the movable lock members for the presence of the unlocked  
condition before retracting the dead bolt.

9.                The dead bolt lock system of claim 8, wherein at least one of  
the security locks is a combination lock.

10.              The dead bolt lock system of claim 8, wherein the first and  
second security locks are combination locks.

11.           The dead bolt lock system of claim 8, wherein the dead bolt retracting structure includes test members adjacent each of the first and second movable lock members and operative to test whether the movable lock members are in locked or unlocked conditions, and during movement of  
5   the retracting structure to retract the dead bolt, the test members test the condition of the movable lock members for the presence of the unlocked condition before retracting the dead bolt.

12.           The dead bolt lock system of claim 8, wherein one of the security locks comprises an electrically operated access control device.

13.           The dead bolt lock system of claim 8 further comprising:  
                  a third security lock in the form of an electrically operated access control device, said access control device having a third movable lock member having a locked condition and an unlocked condition controlled  
5   by the input of correct unlocking information,  
                  wherein the dead bolt retracting structure is operatively connected to the third movable lock member such that the first, second and third movable lock members must each be in the unlocked condition for the retracting structure to move the dead bolt to the retracted position.

14.           A dead bolt lock system for use on a door leading to a secure area, the lock system comprising:

                  an enclosed housing structure having an interior and adapted to be mounted to the door,

5                   a dead bolt mounted in the interior of the housing structure for movement between an extended position in which a portion of the dead bolt extends out of the interior of the housing structure and a retracted position in which the dead bolt is more fully contained within the interior of the housing structure,

10                  a security lock with a casing and a movable lock member each contained within the interior of the housing structure and said lock member having a locked condition extending outwardly from said casing and an unlocked condition retracted within said casing and controlled by the input of correct unlocking information,

15                  a mounting space within the interior of the housing structure adapted to receive the security lock, and

                  dead bolt retracting structure mounted within the interior of the housing structure and including a test member mounted within the interior of the housing structure for movement relative to said dead bolt and adjacent to a portion of the mounting space adapted to receive the movable lock member in the locked condition, wherein the test member moves into the mounting space portion during retraction of the dead bolt to confirm the unlocked condition of the lock member.

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15. The lock system of claim 14 further comprising:

a lock down mechanism operatively coupled to the dead bolt retracting structure to disable the dead bolt retracting structure independent of whether the security lock is in a locked or unlocked condition.

16. The lock system of claim 14 wherein the housing structure includes a cover with members that interact with the dead bolt retracting structure to prevent removal of the cover when the dead bolt is in the extended position and allow removal of the cover when the dead bolt is in the retracted position.

17. The lock system of claim 14 wherein the housing structure includes a cover and further comprising a relock mechanism operatively connected with the cover and the dead bolt retracting structure to prevent operation of the dead bolt retracting structure to retract the dead bolt when the cover is removed.

18. The lock system of claim 14 further comprising a hold back mechanism including a trigger member and a pivoting hold back member connected between the trigger member and the dead bolt, wherein the hold back member pivots against the dead bolt to hold the dead bolt in the retracted position and pivots in an opposite direction to allow extension of the dead bolt upon engagement of the trigger member with a door strike.

19. The dead bolt lock system of claim 18 further comprising an electric sensor device disposed adjacent the hold back member and operative to indicate the position of one of the pivoting hold back member and the trigger member.

20. The dead bolt lock system of claim 14 further comprising an electric sensor device disposed adjacent the mounting space portion and operative to indicate the locked and unlocked conditions of the security lock.

21. The dead bolt lock system of claim 14 further comprising an electric sensor device disposed adjacent the dead bolt and operative to indicate the extended and retracted positions of the dead bolt.

22. The dead bolt lock system of claim 14 further comprising a lock override mechanism operatively connected to the dead bolt retracting structure to allow movement of the dead bolt to the retracted position with a key and independent of the locked or unlocked condition of the security lock.

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23. The dead bolt lock system of claim 14 further comprising force blocking structure connected to the dead bolt and further connected to the housing structure when the dead bolt is in the extended position and disconnected from the housing structure when the dead bolt is in the retracted position, wherein force applied to an outer end of the dead bolt is transmitted to the housing structure by the force blocking structure when the dead bolt is in the extended position.

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24. In a dead bolt lock system having a movable dead bolt and lock support structure for mounting a security lock including a lock bolt movable between extended and retracted positions, the dead bolt lock system mountable to a door for controlling access to a secure area, the dead bolt lock system having a dead bolt retraction mechanism to extend and retract the dead bolt based on a locked or unlocked condition of the security lock, wherein the improvement comprises: a lock bolt tester operatively connected to the lock bolt to test whether the lock bolt is in the extended or the retracted position, said lock bolt tester being further operatively connected with the dead bolt retraction mechanism to allow retraction of the dead bolt when the lock bolt is in the retracted position and prevent extension of the dead bolt when the lock bolt is in the extended position.

25.           A dead bolt lock system for use on a door leading to a secure area, the lock system comprising:

                  housing structure adapted to be mounted on an inside of the door,

5                   a dead bolt mounted in the housing structure for movement between extended and retracted positions,

                  a security lock mounted within the housing structure and including a movable lock member having a locked condition and an unlocked condition controlled by the input of correct unlocking information,

10                   dead bolt retracting structure operatively connected between the movable member of the security lock and the dead bolt such that when the security lock is unlocked, at least a portion of the retracting structure is operative to allow retraction of the dead bolt and, when the security lock is locked, operation of the dead bolt retracting structure is prevented thereby  
15                   preventing retraction of the dead bolt, and

                  an escape lever operatively connected to the dead bolt to retract the dead bolt when the security lock is in either one of the locked or unlocked conditions, said escape lever extending generally from the housing structure and being operable with at least one of a pushing or pulling  
20                   motion to retract the dead bolt.

26. The dead bolt lock system of claim 25, wherein the escape lever is mounted for movement in opposite directions with respect to a neutral position, and the escape lever retracts the dead bolt when moved in either of said opposite directions.

27. The dead bolt lock system of claim 26, wherein the escape lever is spring biased into the neutral position.

28. The dead bolt lock system of claim 25, wherein the lever is mounted for movement toward and away from the housing structure.

29. The dead bolt lock system of claim 25 further comprising a door handle adapted to be mounted on an outside of the door and operatively connected with the dead bolt retracting structure for allowing retraction of the dead bolt by use of the door handle.

30. The dead bolt lock system of claim 1 further comprising:

an escape member coupled to the dead bolt and extending outwardly from the interior of the housing structure, the escape member operable from within the secure area by an occupant to move the dead bolt to the retracted position when the lock member of the first security lock is in the locked condition and when the lock member of the first security lock is in the unlocked condition.

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31.           The dead bolt lock system of claim 3, further comprising:  
                  an escape member coupled to the dead bolt and extending  
outwardly from the interior of the housing structure, the escape member  
operable from within the secure area by an occupant to move the dead bolt  
5 to the retracted position when the movable member of the access control is  
in the locked condition and when the movable member of the access  
control is in the unlocked condition.

32.           The dead bolt lock system of claim 8, further comprising:  
                  an escape member coupled to the dead bolt and extending  
outwardly from the interior of the housing structure, the escape member  
operable from within the secure area by an occupant to move the dead bolt  
5 to the retracted position when the respective first and second lock members  
of the first and second security locks are in the locked condition and when  
the respective first and second lock members of the first and second  
security locks are in the unlocked condition.

33.           The dead bolt lock system of claim 14, further comprising:  
                  an escape member coupled to the dead bolt and extending  
outwardly from the interior of the housing structure, the escape member  
operable from within the secure area by an occupant to move the dead bolt  
5 to the retracted position when the lock member of the security lock is in the  
locked condition and when the lock member of the security lock is in the  
unlocked condition.

34. A dead bolt lock system for use on a door leading to a secure area, the lock system comprising:

an enclosed housing structure having an interior and adapted to be mounted to the door,

5 a dead bolt mounted in the interior of the housing structure for movement between an extended position in which a portion of the dead bolt extends out of the interior of the housing structure and a retracted position in which the dead bolt is more fully contained within the interior of the housing structure,

10 dead bolt retracting structure operatively connected to the dead bolt for moving the dead bolt from the extended position to the retracted position,

a security lock including a casing and a lock member each contained within the interior of the housing structure and said lock member  
15 moved from a locked condition extending outwardly from said casing to an unlocked condition retracted within said casing by the input of correct unlocking information, and

a test member mounted within the housing structure for pivotal movement adjacent to the lock member of the security lock in a  
20 transverse direction relative to the movement of said lock member in a transverse, said test member further mounted for movement relative to the dead bolt and coupled with the dead bolt retracting structure to prevent retraction of the dead bolt when the lock member is in the locked condition



and to allow retraction of the dead bolt in said transverse direction when  
25 the lock member in the unlocked condition, said test member adapted to  
pivot in a direction transverse to a plane containing the dead bolt retracting  
structure and with the dead bolt retracting structure providing the  
transverse movement of said test member as the dead bolt retracting  
structure moves the dead bolt from the extended position to the retracted  
30 position.

35. A dead bolt lock system for use on a door leading to a secure area, the lock system comprising:

an enclosed housing structure having an interior and adapted to be mounted to the door,

5 a dead bolt mounted in the interior of the housing structure for movement between an extended position in which a portion of the dead bolt extends out of the interior of the housing structure and a retracted position in which the dead bolt is more fully contained within the interior of the housing structure,

10 a security lock including a casing and a lock member each contained within the interior of the housing structure and said lock member moved from a locked condition extending outwardly from said casing to an unlocked condition retracted within said casing by the input of correct unlocking information,

15 dead bolt retracting structure operatively connected to the dead bolt for moving the dead bolt from the extended position to the retracted position, the dead bolt retracting structure having a slotted opening with a first portion extending transversely relative to the direction of movement of said lock member and a second portion extending  
20 substantially parallel to the direction of movement of said lock member, and

a test member mounted within the housing structure and having a portion movable within said first and second portions of said slotted opening as the dead bolt retracting structure moves the dead bolt from the extended position to the retracted position, said test member

25 further mounted for movement relative to the dead bolt and coupled with the dead bolt retracting structure to prevent retraction of the dead bolt when the lock member is in the locked condition and movable in said transverse direction into a space created by the lock member in the unlocked condition to thereby allow retraction of the dead bolt.

36. A dead bolt lock system for use on a door leading to a secure area, the lock system comprising:

housing structure adapted to be mounted on an inside of the door,

5 a dead bolt mounted in the housing structure for movement between extended and retracted positions,

a lock coupled with the dead bolt and controlled by the input of correct unlocking information to allow movement of the dead bolt from the extended position to the retracted position,

10 dead bolt retracting structure operatively connected to the dead bolt such that when the lock is unlocked, at least a portion of the retracting structure is operative to allow retraction of the dead bolt and, when the lock is locked, operation of the dead bolt retracting structure is prevented thereby preventing retraction of the dead bolt,

15 an escape lever including a movable arm operatively connected to the dead bolt to retract the dead bolt when the security lock is in either one of the locked or unlocked conditions, said escape lever extending generally from the housing structure and being operable with at least one of a pushing or pulling motion to retract the dead bolt, and

20 an inertia member mounted to rotate into a position which prevents movement of the arm and thereby prevents inertial operation of the escape lever upon impact of the lock system by an outside force.